Acquisition of a High-Resolution, Point-Focusing Small-Angle X-Ray Scattering System for Nanostructured Materials Research and Education

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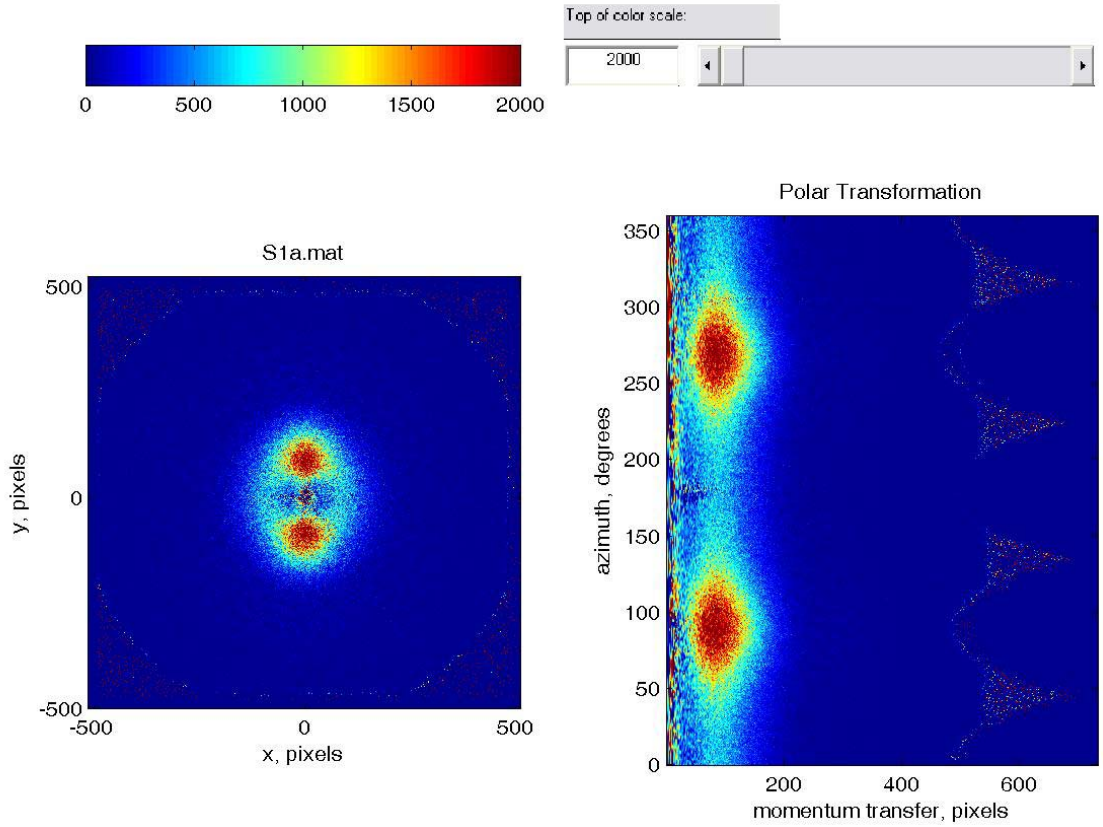
- powerful tool for structural characterization of nanomaterials, including self-assembling and semicrystalline polymers, templated silicates, and nanocomposites
- designed to resolve structures as large as 100 nm (and as small as 0.5 nm)
- unique system custom-built by Molecular Metrology
- serves users from Princeton, New Jersey Institute of Technology, and local industry



Representative 2D small-angle x-ray scattering pattern: DuPont-blown film of a semicrystalline polymer (polyethylene), 2 mils thick. Insight into the structure-property relationships of such materials will enable the design of higher-performance, lower-weight packaging materials.

Left: 2D SAXS pattern (peak at q = 0.32 nm^{-1}). Right: same pattern transformed to row-column format for quantitative analysis.

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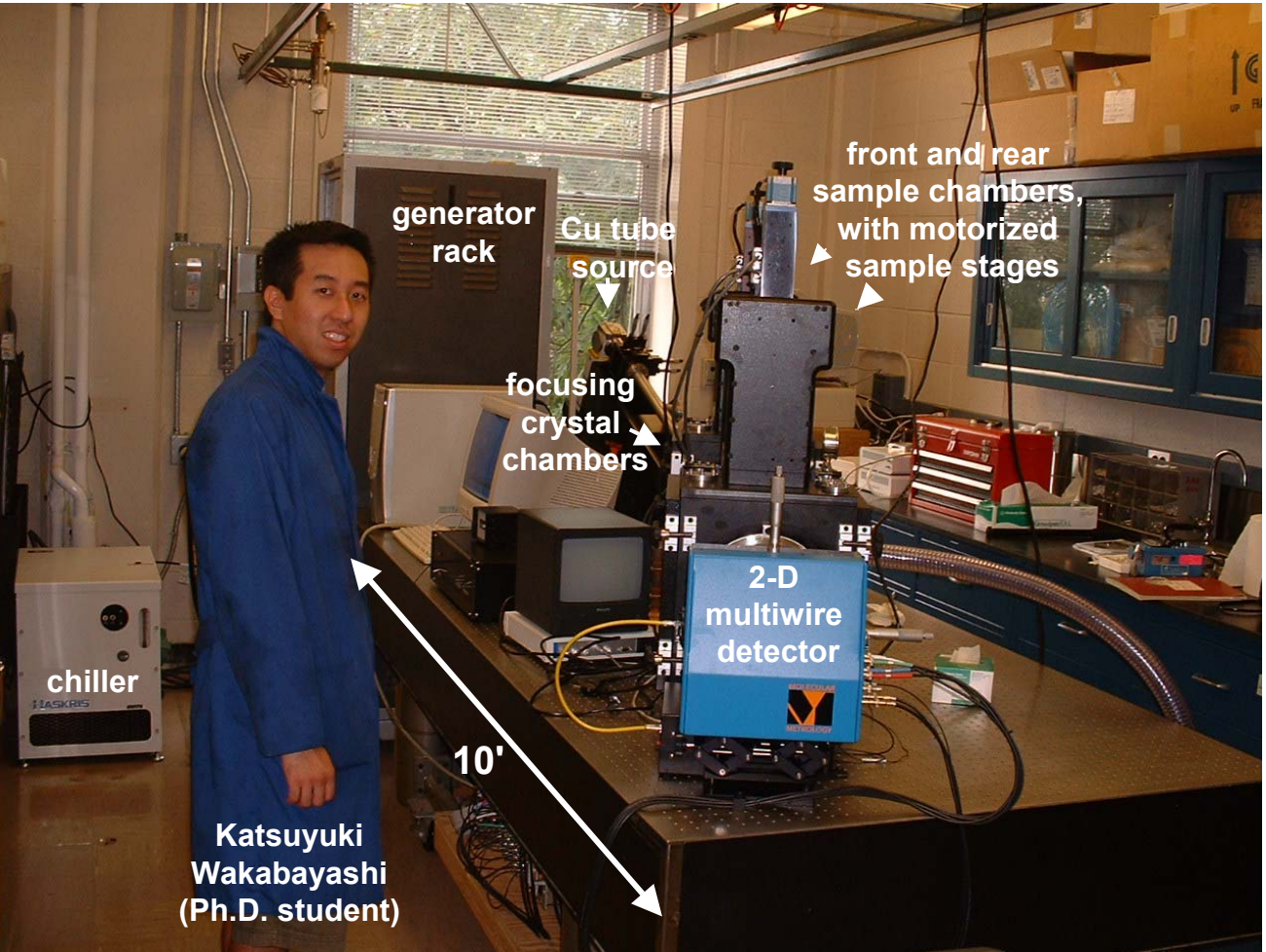
Large sample chambers located at two positions along beam path facilitate the study of diverse materials, as well as encouraging the design of custom sample stages by graduate students and postdocs, providing invaluable expertise in instrument design and construction



In its shakedown phase, the instrument has already been used by **four graduate students** and **one postdoctoral fellow**, to study both organic and inorganic materials, using both a sample heating and a sample cooling stage. Two additional stages are currently being designed: one for electric field poling, a second for uniaxial stretching.